Science Update

Clever Plant Tricks That Protect Raspberries

While protective coloration is well known among animals that rely on blending in with their environs, such adaptations aren't often noticed in the plant world. But it appears that raspberries may rely on a similar ruse to hide from deer and insects and for protection against disease, ultraviolet rays, oxidation, and dehydration in freezing weather.

How do they do it? Some raspberries have evolved leaves with fuzzy, light-colored, reflective undersides that fool insects that expect plants to be green. The fuzziness also repels water. This prevents moisture from spreading plant diseases and keeps it from blocking leaf openings, or stomata, through which the plants make the gas exchange needed for photosynthesis. In winter, the stems, or canes, turn from green to red, which helps protect them from ultraviolet rays and oxidation. *Charles M. Feldhake, USDA-ARS Appalachian Farming Systems Research Center, Beaver, West Virginia; phone (304) 256-2830, e-mail charlie.feldhake@ars.usda.gov.*

Replacing the Ties That Bind

About 85 million bales of cotton are produced worldwide each year, including 18 to 20 million in the United States. These tightly compacted bundles of fiber are held together by bale ties—either steel or plastic straps or wire—about 4 percent of which fail. That's roughly 800,000 cotton bale ties that need repair or replacement each year, at a cost of $10 to $45 each. Large warehouses where cotton is stored must invest in costly bale presses to make the replacements. Smaller warehouses and cotton gins have to ship defective bales to a warehouse or gin that has the necessary equipment. This costs processors an estimated $8 to $36 million each year. Now a device has been invented that can replace even multiple failed bale ties easily and efficiently. The invention has been patented and is available for licensing. *W. Stanley Anthony, USDA-ARS Cotton Ginning Research Unit, Stoneville, Mississippi; phone (662) 686-3094, e-mail santhony@ars.usda.gov.*

Measuring Heat Stress–From Inside the Cow

Heat stress can kill livestock—or reduce their productivity and cause economic losses for producers. Scientists conducting long-term heat-stress studies have needed a way to easily obtain accurate readings on animals' internal temperatures. University researchers both here and abroad recently evaluated an improved telemetry system to do just that. It involves placing a temperature sensor and transmitter into the animal to measure its core body temperature and then transmit the reading. The tiny devices are enclosed in 1-inch-long capsules and, for short-term experiments, swallowed by the test animals. For longer term studies, the 3- to 4-inch capsules are surgically implanted in the animals, where they can stay in place for up to a year. *Tami M. Brown-Brandl, USDA-ARS Roman L. Hruska U.S. Meat Animal Research Center, Clay Center, Nebraska; phone (402) 762-4279, e-mail brandl@email.marc.usda.gov.*

Plant Roots Take Advantage of Their Situation

A discovery has startled the botanical world! Plant roots—those silent, unseen burrowers—have a greater capacity to take advantage of sudden environmental changes than anyone suspected. So-called adventitious roots grow from a different layer of plant cells than regular, lateral roots. Even when a plant has used up all the tissue available for growing regular roots, many can still grow special roots to capture, say, a rare rain in a desert environment.

So far, 22 species of plants from 12 different families in 9 orders have shown evidence of being able to regrow roots from the same spot on a root, on short notice. These adventitious, or opportunistic, roots grow in clusters along older roots—even on larger roots whose laterals have long since died back. Researchers think that this type of root growth may be a common occurrence that routinely helps plants obtain water and nutrients. The roots of alfalfa, carrots, and maple trees have the capacity. If adventitious rooting could be introduced into a crop like cotton, it could lead to new production efficiencies. *Richard W. Zobel, USDA-ARS Appalachian Farming Systems Research Center, Beaver, West Virginia; phone (304) 256-2825, e-mail rzobel@afsrc.ars.usda.gov.*

Proteins Could Cut Food Poisoning

Foodborne bacterial infections cost billions of dollars in losses each year. In the United States, *Campylobacter* is one of the most common bacterial causes of human diarrheal illness, and poultry has been identified by the Centers for Disease Control and Prevention as the primary source of its transmission. Controlling *Campylobacter* in poultry would greatly reduce consumer exposure.

Now proteins called bacteriocins, obtained from harmless microorganisms, have been found to reduce numbers of *Campylobacter, Salmonella,* and other disease-causing bacteria associated with poultry. This is the first therapeutic treatment tried in the past 25 years that has achieved a consistent reduction in *Campylobacter.* In small research trials, bacteriocins were found to reduce *Campylobacter* numbers by 99.999 percent. But large trials will be needed to determine the commercial feasibility of the technology. A patent has been filed, and the technology is available for licensing. *Norman J. Stern, USDA-ARS Poultry Microbiological Safety Research Unit, Athens, Georgia; phone (706) 546-3516, e-mail nstern@saa.ars.usda.gov.*